UNITED STATES PATENT AND TRADEMARK OFFICE

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/788,958	02/28/2004	Richard E. Harper	YOR920030494US1 (590.119)	6692

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FERENCE & ASSOCIATES		MEHRMANESH, ELMIRA
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Please find below and/or attached an Office communication concerning this application or proceeding.

PTO-90C (Rev. 10/03)

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE <u>3</u> MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on <u>28 February 2004</u>.

2a)☐ This action is **FINAL**.   2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) <u>1-43</u> is/are pending in the application.

    4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) <u>1-43</u> is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on <u>28 February 2004</u> is/are: a)☒ accepted or b)☐ objected to by the Examiner.

    Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

    Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

    a)☐ All b)☐ Some * c)☐ None of:

        1.☐ Certified copies of the priority documents have been received.

        2.☐ Certified copies of the priority documents have been received in Application No. _____.

        3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

    * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☐ Information Disclosure Statement(s) (PTO/SB/08)
    Paper No(s)/Mail Date _____.

4) ☐ Interview Summary (PTO-413)
    Paper No(s)/Mail Date. _____ .

5) ☐ Notice of Informal Patent Application

6) ☐ Other: _____.

DETAILED ACTION

The application of Harper et al., for an "Automatic crash recovery in computer

operating systems" filed February 28, 2004, has been examined.

Claims 1-43 are presented for examination.

Claims 23-42 are rejected under 35 USC § 101.

Claims 1-10, 13-30, and 33-43 are rejected under 35 USC § 102.

Claims 11-12, and 31-32 are rejected under 35 USC § 103.

Claim Rejections - 35 USC § 101

35 U.S.C. 101 reads as follows:

Whoever invents or discovers any new and useful process, machine, manufacture, or composition of
matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the
conditions and requirements of this title.

Claims 23-42 are rejected under 35 U.S.C. 101 because the claimed invention is

directed to non-statutory subject matter.

As per claims 23 and 24, the limitation of "an arrangement for" is directed to an

arrangement of software. Computer programs claimed as computer listings per se, i.e.,

the descriptions or expressions of the programs are not physical "things." They are

neither computer components nor statutory processes, as they are not "acts" being

performed. Such claimed computer programs do not define any structural and functional

interrelationships between the computer program and other claimed elements of a

computer, which permit the computer program's functionality to be realized.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that

form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1-10, 13-30, and 33-43 are rejected under 35 U.S.C. 102(b) as being

anticipated by Klemm et al. (U.S. Patent No. 6,457,142).

As per claim 1, Klemm discloses a method of providing automatic recovery from

operating system faults, said method comprising the steps of: detecting a system fault

(Fig. 7, element 701) analyzing the system fault (Fig. 7, elements 702 and 703)

determining a cause of the system fault (Fig. 7, elements 702 and 703) determining a

solution (Fig. 7, element 704) and applying a solution (Fig. 7, element 707).

As per claim 2, Klemm discloses providing a resolution test (Fig. 7, element 701)

and returning to production (Fig. 7, element 708).

As per claim 3, Klemm discloses at least one of the recited steps does not

require any work (Fig. 3).

As per claim 4, Klemm discloses at least one of the recited steps does not require any work (Fig. 3).

As per claim 5, Klemm discloses said detecting step comprises at least one of: an operating system call to a halting routine (Fig. 7, element 701) and an exception or error associated with at least one of: an operating system, middleware, firmware and Licensed Internal Code (Fig. 7, element 701).

As per claim 6, Klemm discloses said detecting step comprises an abnormal termination of a driver or application (Fig. 4, element 406).

As per claim 7, Klemm discloses said detecting step comprises a hypervisor observation of unusual behavior from a guest operating system (Fig. 7).

As per claim 8, Klemm discloses said detecting step comprises an interception of a call to an operating system halting routine or exception handler (Fig. 7, element 701).

As per claim 9, Klemm discloses said detecting step comprises automatically inspecting at least one aspect relating to the operating system (Fig. 8)

As per claim 10, Klemm discloses said detecting step comprises automatically inspecting at least one of: main memory; a kernel stack; process stacks; a state of all

running threads; an amount of pageable memory used; an amount of pageable memory free for use; an amount of total pageable memory in the system; an amount of total pageable memory available to the operating system kernel; an amount of non-pageable memory used; an amount of Non-pageable memory free for use; an amount of total non-pageable memory in the system; an amount of total non-pageable memory available to the operating system kernel; a number of system page table entries used; a number of system page table entries available for use; an amount of virtual memory allocated to a system page table; a size of a system cache; a size of a page cache; a size of a file cache; an amount of space available in a system cache; an amount of space available in a page cache; an amount of space available in a file cache; a size of a system working set; a number of system buffers available; page sizes; a number of network connections established; utilization of one or more central processing units; a number of threads allocated; a percentage of time spent in a kernel; a number of system interrupts per unit time; a number of page faults per unit time; a number of page faults in a system cache per unit time; a number of paged pool allocations per unit time; a number of non-paged pool allocations per unit time; a length of look-aside lists; a number of open file descriptors; an amount of free space on a disk or disks; a percentage of time spent at interrupt level; a number of device drivers that are loaded; status of loaded device drivers; a number of outstanding I/O requests for device drivers; a state of devices attached to the system (Fig. 3 and 8) and (col. 5-6).

As per claim 13, Klemm discloses said step of automatically inspecting is performed via software (Fig. 8).

As per claim 14, Klemm discloses said step of determining a cause comprises identifying at least one faulty component (Fig. 7).

As per claim 15, Klemm discloses said analyzing step provides input into said step of determining a cause (Fig. 7, elements 703 and 704).

As per claim 16, Klemm discloses external information provides input into said step of determining a cause (Fig. 7, elements 703 and 704).

As per claim 17, Klemm discloses said step of applying a solution comprises effecting one or more changes or updates in at least one of: device driver software, operating system code, and firmware (Fig. 7, element 707).

As per claim 18, Klemm discloses said step of effecting one or more changes or updates comprises deactivating faulty software (Fig. 7, element 706).

As per claim 19, Klemm discloses said step of providing a resolution test comprises monitoring a new component during a trial period (Fig. 5).

As per claim 20, Klemm discloses the trial period is over a finite period of time (col. 4, lines 8-25).

As per claim 21, Klemm discloses the status of the new component is reported subsequent to the trial period (Fig. 5).

As per claim 22, Klemm discloses at least one of the following steps is repeated upon determination of a negative status of the new component: detecting a system fault (Fig. 7, element 701) analyzing the system fault (Fig. 7, elements 702 and 703) determining a cause of the system fault (Fig. 7, elements 702 and 703) determining a solution (Fig. 7, element 704) and applying a solution (Fig. 7, element 707) and providing a resolution test (Fig. 7, element 701).

As per claim 23, Klemm discloses an apparatus for providing automatic recovery from operating system faults, said apparatus comprising: an arrangement for detecting a system fault (Fig. 7, element 701) an arrangement for analyzing the system fault (Fig. 7, elements 702 and 703) an arrangement for determining a cause of the system fault (Fig. 7, elements 702 and 703) an arrangement for determining a solution (Fig. 7, element 704) and an arrangement for applying a solution (Fig. 7, element 707).

As per claim 24, Klemm discloses an arrangement for providing a resolution test (Fig. 7, element 701) and an arrangement for returning to production (Fig. 7, element

708).

As per claim 25, Klemm discloses said detecting arrangement is adapted to provide at least one of: an operating system call to a halting routine (Fig. 7, element 701) and an exception or error associated with at least one of: an operating system, middleware, firmware and Licensed Internal Code (Fig. 7, element 701).

As per claim 26, Klemm discloses said detecting arrangement is adapted to provide an abnormal termination of a driver or application (Fig. 4, element 406).

As per claim 27, Klemm discloses said detecting arrangement is adapted to provide a hypervisor observation of unusual behavior from a guest operating system (Fig. 7).

As per claim 28, Klemm discloses said detecting arrangement is adapted to provide an interception of a call to an operating system halting routine or exception handler (Fig. 7, element 701).

As per claim 29, Klemm discloses said detecting arrangement is adapted to automatically inspect at least one aspect relating to the operating system (Fig. 8).

As per claim 30, Klemm discloses said detecting arrangement is adapted to
automatically inspect at least one of: main memory; a kernel stack; process stacks; a
state of all running threads; an amount of pageable memory used; an amount of
pageable memory free for use; an amount of total pageable memory in the system; an
amount of total pageable memory available to the operating system kernel; an amount
of non-pageable memory used; an amount of Non-pageable memory free for use; an
amount of total non-pageable memory in the system; an amount of total non-pageable
memory available to the operating system kernel; a number of system page table
entries used; a number of system page table entries available for use; an amount of
virtual memory allocated to a system page table; a size of a system cache; a size of a
page cache; a size of a file cache; an amount of space available in a system cache; an
amount of space available in a page cache; an amount of space available in a file
cache; a size of a system working set; a number of system buffers available; page
sizes; a number of network connections established; utilization of one or more central
processing units; a number of threads allocated; a percentage of time spent in a kernel;
a number of system interrupts per unit time; a number of page faults per unit time; a
number of page faults in a system cache per unit time; a number of paged pool
allocations per unit time; a number of non-paged pool allocations per unit time; a length
of look-aside lists; a number of open file descriptors; an amount of free space on a disk
or disks; a percentage of time spent at interrupt level; a number of device drivers that
are loaded; status of loaded device drivers; a number of outstanding I/O requests for

device drivers; a state of devices attached to the system (Fig. 3 and 8) and (col. 5-6).

As per claim 33, Klemm discloses said detecting arrangement is adapted to perform automatic inspecting via software (Fig. 8).

As per claim 34, Klemm discloses said arrangement for determining a cause is adapted to identify at least one faulty component (Fig. 7).

As per claim 35, Klemm discloses said analyzing arrangement provides input into said arrangement for determining a cause (Fig. 7, elements 703 and 704).

As per claim 36, Klemm discloses external information provides input into said arrangement for determining a cause (Fig. 7, elements 703 and 704).

As per claim 37, Klemm discloses said arrangement for applying a solution is adapted to effect one or more changes or updates in at least one of: device driver software, operating system code, and firmware (Fig. 7, element 707).

As per claim 38, Klemm discloses said arrangement for effecting one or more changes or updates is adapted to deactivate faulty software (Fig. 7, element 706).

As per claim 39, Klemm discloses said arrangement for providing a resolution

test comprises monitoring a new component during a trial period (Fig. 5).

As per claim 40, Klemm discloses the trial period is over a finite period of time

(col. 4, lines 8-25).

As per claim 41, Klemm discloses said arrangement for providing a resolution

test is adapted to report the status of the new component subsequent to the trial period

(Fig. 5).

As per claim 42, Klemm discloses at least one of the following is repeated upon

determination of a negative status of the new component (Fig. 7): detecting a system

fault (Fig. 7, element 701) analyzing the system fault (Fig. 7, elements 702 and 703)

determining a cause of the system fault (Fig. 7, elements 702 and 703) determining a

solution (Fig. 7, element 704) and applying a solution (Fig. 7, element 707) and

providing a resolution test (Fig. 7, element 701).

As per claim 43, Klemm discloses a program storage device readable by

machine, tangibly embodying a program of instructions executable by the machine to

perform method steps for providing automatic recovery from operating system faults,

said method comprising the steps of: detecting a system fault (Fig. 7, element 701)

analyzing the system fault (Fig. 7, elements 702 and 703) determining a cause of the

system fault (Fig. 7, elements 702 and 703) determining a solution (Fig. 7, element 704)

and applying a solution (Fig. 7, element 707).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all

obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

The factual inquiries set forth in *Graham* v. *John Deere Co.*, 383 U.S. 1, 148

USPQ 459 (1966), that are applied for establishing a background for determining

obviousness under 35 U.S.C. 103(a) are summarized as follows:

1.   Determining the scope and contents of the prior art.
2.   Ascertaining the differences between the prior art and the claims at issue.
3.   Resolving the level of ordinary skill in the pertinent art.
4.   Considering objective evidence present in the application indicating obviousness or nonobviousness.

Claims 11-12, and 31-32 are rejected under 35 U.S.C. 103(a) as being

unpatentable over Klemm et al. (U.S. Patent No. 6,457,142) in view of Chandiramani et

al. (U.S. Patent No. 6,691,250).

As per claim 11, Klemm fails to explicitly disclose memory corruption.

Chandiramani teaches:

of automatically inspecting comprises determining a degree of memory corruption (col. 7, lines 39-52).

It would have been obvious to one of ordinary skill in the art at the time the invention to use the method of supervising target application program of Klemm et al.'s in combination with the fault handling process for enabling recovery, diagnosis, and self-testing of computer systems of Chandiramani et al. to reliably recover from system failures.

ordinary skill in the art at the time the invention would have been motivated to make the combination because Klemm et al. discloses performance monitoring and fault tolerance for application programs (col. 1, lines 29-37) and (Figs. 7 and 8). Chandiramani et al. discloses a fault handling process with diagnoses and recovery for system faults (col. 5, lines 6-23) and (Figs. 1, 3A-B).

As per claim 12, Klemm fails to explicitly disclose manual fault resolution. Chandiramani teaches:

manual fault resolution is prompted if memory corruption is detected (Fig. 3B, element 316) and (col. 7, lines 39-52).

As per claim 31, Klemm fails to explicitly disclose memory corruption. Chandiramani teaches:

detecting arrangement is adapted to determine a degree of memory corruption (col. 7, lines 39-52).

As per claim 32, Klemm fails to explicitly disclose manual fault resolution.

Chandiramani teaches:

manual fault resolution is prompted if memory corruption is detected (Fig. 3B, element 316) and (col. 7, lines 39-52).

Related Prior Art

The following prior art is considered to be pertinent to applicant's invention, but nor relied upon for claim analysis conducted above.

Spilo et al. (U.S. Patent No. 6,240,531), "System and method for computer operating system protection".

Chaiken et al. (U.S. Patent No. 6,587,966), "Operating system hang detection and correction".

Lodrige (U.S. Patent No. 6,961,874), "Software hardening utilizing recoverable, correctable, and unrecoverable fault protocols".

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Elmira Mehrmanesh whose telephone number is (571) 272-5531. The examiner can normally be reached on 8-5 M-F.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Robert W. Beausoliel can be reached on (571) 272-3645. The fax phone

number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).